
GENERAL ARTICLES

Patterns of HIV Risk and Preventive Behaviors Among Teenage Men

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Synopsis

Analyses of the 1988 National Survey of Adolescent Males indicate the prevalence of risk behaviors related to acquired immunodeficiency syndrome, including sexual, contraceptive, and drug use be-

haviors, among 15- to 19-year-old men. About three-fifths had sexual intercourse, indicating that a majority of teenage men have at least some potential exposure to the human immunodeficiency virus (HIV) or sexually transmitted disease.

From a behavioral perspective, the average sexually active teenage man used a condom more than half the time in the 12 months before the interview. Those with most experience with sexual intercourse, however, used condoms least frequently. More important from an epidemiologic perspective, a third of all acts of intercourse in the prior year were protected using condoms. Further, behaviors with the greatest direct risks for HIV infection, such as homosexual intercourse, use of intravenous drugs, and sex with intravenous drug users or prostitutes, appear to be relatively uncommon.

Teenage men who demonstrate high-risk behavior, including both sexual and substance abuse, compound their risks, because risks generally are correlated. Condom use is a preventive behavior that is negatively correlated with most risk behaviors; those who have multiple partners, or who are substance abusers, tend to use condoms least. The convergence of risks for multi-problem teenage men indicates the relevance of interventions directed to high-risk youths.

BETWEEN 1986 AND 1988, acquired immunodeficiency syndrome (AIDS), previously the seventh leading cause of death for those 15 to 24 years of age in the United States, became the sixth leading cause (1, 2). Sexually transmitted diseases (STD), such as gonorrhea and syphilis, are still common among teenagers and incidence is rising among black teenagers (3).

Epidemiologic and clinical research indicates two sources of human immunodeficiency virus (HIV) infection among adolescents, sexual transmission (homosexual and heterosexual) and parenteral transmission (including intravenous [IV] drug use, blood transfusions, and treatment for hemophilia). In addition to the risk groups of homosexual men and IV drug users, recent work suggests high risks among other groups, such as homeless youths, crack users, and patients of STD clinics (4, 5). The

confluence of numerous social and health problems with AIDS and STD indicates the interrelationships of numerous risk behaviors, ranging from sexual behavior to substance use. Use of condoms, in conjunction with reduction or cessation of risk behavior, has been promoted widely as a key preventive measure.

We present nationally representative data from the National Survey of Adolescent Males, 1988 (NSAM). We discuss first, how common HIV and STD risk and preventive behaviors are, and second, how these behaviors are related.

Methods

NSAM is a nationally representative household survey of 1,880 never-married, noninstitutionalized, 15- to 19-year-old men, living in the conterminous

Table 1. Mean levels of heterosexual activity among 1,198 men 15 to 19 years old reporting sexual intercourse in the last 12 months, by race, age, and region, 1988

| Characteristic | Partners | | Acts of intercourse | | Frequency of condom use | |
|---------------------------|----------|---------|---------------------|---------|-------------------------|---------|
| | Mean | P value | Mean | P value | Mean | P value |
| All | 2.1 | | 23.3 | | 0.56 | |
| Race or ethnicity: | | | | | | |
| Black, non-Hispanic | 2.5 | < 0.001 | 14.7 | < 0.001 | 0.61 | < 0.05 |
| White, non-Hispanic | 2.0 | < 0.001 | 26.5 | < 0.001 | 0.54 | < 0.05 |
| Hispanic or other | 1.8 | < 0.001 | 19.0 | < 0.001 | 0.53 | < 0.05 |
| Age at interview (years): | | | | | | |
| 15 | 2.1 | NS | 12.5 | < 0.001 | 0.63 | < 0.001 |
| 16 | 2.1 | NS | 13.0 | < 0.001 | 0.61 | < 0.001 |
| 17 | 1.9 | NS | 18.3 | < 0.001 | 0.61 | < 0.001 |
| 18 | 2.0 | NS | 20.8 | < 0.001 | 0.52 | < 0.001 |
| 19 | 2.2 | NS | 44.3 | < 0.001 | 0.47 | < 0.001 |
| Region: | | | | | | |
| Northeast | 2.1 | < 0.01 | 34.5 | < 0.001 | 0.50 | < 0.05 |
| South | 2.2 | < 0.01 | 21.1 | < 0.001 | 0.55 | < 0.05 |
| Midwest | 2.1 | < 0.01 | 22.1 | < 0.001 | 0.62 | < 0.05 |
| West | 1.6 | < 0.01 | 16.8 | < 0.001 | 0.54 | < 0.05 |

NOTE: Because of nonnormal distribution, significance is based on the Kruskal-Wallis one-way analysis of variance. NS = not significant.

SOURCE: National Survey of Adolescent Males, 1988.

United States, conducted April to November 1988 (6). The multistage probability survey over-sampled black and Hispanic youths, based on a sample frame developed by the Institute for Survey Research from the 1980 census. The overall survey response rate was 73.9 percent. The causes of nonresponse included parental refusals (6.1 percent), respondent refusals (12.7 percent), and inability to conduct interviews, as for example, the eligible subject not being available (6.3 percent). Sample weights were developed to account for probability of selection, screening nonresponse, individual nonresponse, and poststratification to conform with the Bureau of the Census Current Population Survey for March 1987 (7). All subsequent analyses were weighted, unless otherwise noted.

As a household survey of noninstitutionalized, never-married persons, the sampling frame excluded institutionalized persons (for example, those in prisons, hospitals, or residential treatment centers), those living in group quarters (for example, in dormitories or military barracks), and those who had ever been married. Comparisons with census data indicate that the sampling frame represents more than 90 percent of the 15- to 19-year-old men. In this group, 1.1 percent were institutionalized, 6.4 percent were in noninstitutional group quarters in 1980, and 1.8 percent were ever married in 1988 (8, 9). In practice, the survey coverage was broader than 90 percent, because 100 men interviewed lived in dormitories or barracks at other

times of the year (for example, interviewed at home in the summer, but lived in dormitories during the school year). Unlike school-based surveys, NSAM includes dropouts. The survey probably missed some in high-risk groups, such as homeless youths, who are inherently difficult to survey in probability samples of households.

Respondents were interviewed by trained professional interviewers for about an hour at home or in private in some other location. At the completion of the interview, subjects took about 10 to 15 minutes to complete a confidential, self-administered questionnaire, which the interviewer did not see. The questionnaire asked about some behaviors that a subject would feel most sensitive about, such as homosexual behavior and drug use. All data were self-reported and subject to misreporting.

The analyses focus on behaviors either in the past year or in the subject's lifetime. NSAM asked about the frequency of heterosexual intercourse and condom use for recent partners (up to six partners in the 12 months preceding the interview). Questions were framed to obtain detailed information about each relationship because we believed recall to be more accurate when directed to specific relationships. However, timeframes for relationships varied; one person's last relationship lasted more than a year and another's lasted a day. For these analyses we created a standard reference timeframe, converting relationship-specific data to estimates of frequency of intercourse and condom use in the past 12 months, based on the extent to

which each relationship took place in the last year. For the 45 men who had more than 6 partners in the year preceding the interview, estimations of frequency of intercourse and condom use were based on patterns for partners three through six. The estimation process has been described (10).

Results

Heterosexual behavior. Overall, 60.4 percent of the teenage men reported ever having heterosexual intercourse, but only 57.4 percent had within the 12 months preceding the interview. Table 1 shows the mean of the numbers of heterosexual partners in the last year, the number of acts of intercourse in the last year, and the frequency of condom use in the last year.

Of those sexually active in the past year, about half (52 percent) reported having one partner in the past year. Eight percent of those reporting intercourse in the past year had five or more partners in that period (4.4 percent of all 15- to 19-year old men).

Those reporting sexual intercourse in the past year averaged 23 acts in that period. Among all respondents, reporting having sexual intercourse or not, the mean number of acts was 11. These data indicate that the average sexually active teenage man has intercourse at a rate of about once each 2 weeks, although other analyses indicate the frequency to be episodic during the year (11).

We reported that the proportion of urban men 17 to 19 years old who used a condom at last intercourse rose from 21 percent in 1979 to 58 percent in 1988 (6). Subsequently we examined the consistency with which each person used condoms during a year. The primary measure of condom use is the frequency of use in the past 12 months, which is the number of times the man used a condom divided by the number of times he had intercourse. Although the average frequency of condom use was 0.56, about a fifth of the subjects (22 percent) never used a condom, a third (35 percent) always used one, and fewer than half (43 percent) used one intermittently.

Although the survey group had a condom use frequency of 0.56, the proportion of acts of intercourse that were protected with a condom was 0.34 for all subjects (the total number of times a condom was used divided by the number of acts of intercourse), because those who had intercourse most frequently used condoms least. The number 0.56 is important as a behavioral measure of a central tendency of condom use among youth. The

Table 2. Prevalence of high-risk behavior among 1,880 men 15 to 19 years old reporting sexual intercourse in the last 12 months, 1988

| Risk | Percent |
|---|---------|
| Ever had some homosexual contact..... | 2.1 |
| Ever had homosexual intercourse..... | 1.4 |
| Had homosexual intercourse in the last year.... | 0.3 |
| Ever had sex with a prostitute..... | 0.7 |
| Ever had sex with an IV drug user..... | 0.7 |
| Ever used IV drugs..... | 0.5 |
| Ever shared IV drug needles..... | 0.2 |
| At high risk ¹ | 9.6 |

¹ High risk based on 1 or more factors: 5 or more heterosexual partners in the year, ever had insertive or receptive homosexual intercourse, ever used IV drugs, ever had sex with a prostitute, or ever had sex with an IV drug user.

SOURCE: National Survey of Adolescent Males, 1988.

Table 3. Relation of sexual orientation to risk behavior among 1,880 men 15 to 19 years old reporting sexual intercourse in the last 12 months, 1988

| Self-reported sexual orientation | Percent distribution of subjects' response to question of ever having homosexual intercourse | | | Total |
|----------------------------------|--|-----|-----------|-------|
| | No | Yes | No answer | |
| 100 percent heterosexual ... | 84.9 | 0.3 | 1.4 | 86.6 |
| Mostly heterosexual | 2.9 | 0.6 | 0.1 | 3.6 |
| Bisexual..... | 0.8 | 0.2 | 0.0 | 1.0 |
| Mostly homosexual..... | 0.3 | 0.1 | ... | 0.4 |
| 100 percent homosexual ... | 0.1 | ... | ... | 0.1 |
| Not sure..... | 5.2 | 0.1 | 0.2 | 5.5 |
| No answer..... | 1.6 | 0.1 | 1.0 | 2.7 |
| Total..... | 95.9 | 1.4 | 2.7 | 100.0 |

NOTE: A blank cell means no responses to this combination. 0.0 means at least 1 person responded, but the weighted value was less than 0.1 percent.

SOURCE: National Survey of Adolescent Males, 1988.

number 0.34 may be more important epidemiologically because it is a measure of the proportion of the exposures to potential disease transmission or to partner impregnation that are condom-protected.

Table 1 compares heterosexual activity and condom use by race or ethnicity and age within the four standard census regions. Black teenagers used condoms more often and had more partners per year, but they had intercourse less often than white teenagers. The finding that black youths used condoms more often than white youths is contrary to popular opinion, but the finding has been observed both in NSAM and the 1979 National Survey of Young Men (12).

The older teenage men had more frequent intercourse than the younger teenagers, but the average number of partners did not change with age. This finding suggests that although relationships among

Table 4. Matrix of unweighted Spearman correlation coefficients for risk behavior among

| Characteristic | Acts of heterosexual intercourse | | Number of women partners | | Homosexual intercourse | |
|--|----------------------------------|---------|--------------------------|---------|------------------------|---------|
| | Coefficient | P value | Coefficient | P value | Coefficient | P value |
| Frequency of condom use in last year..... | -0.252 | < 0.001 | -0.102 | < 0.001 | 0.004 | NS |
| Acts of heterosexual intercourse in past year..... | ... | ... | 0.842 | < 0.001 | 0.006 | NS |
| Number of woman partners in past year..... | ... | ... | ... | ... | 0.017 | NS |
| Had homosexual intercourse in past year..... | ... | ... | ... | ... | ... | ... |
| Ever had sex with a prostitute..... | ... | ... | ... | ... | ... | ... |
| Ever had STD..... | ... | ... | ... | ... | ... | ... |
| Ever had sex with IV drug user..... | ... | ... | ... | ... | ... | ... |
| Ever used IV drugs..... | ... | ... | ... | ... | ... | ... |
| Frequency of alcohol use in past year..... | ... | ... | ... | ... | ... | ... |

NOTE: Because frequency of use of condoms is undefined for those without intercourse in the last year, the sample sizes for condom use range from 1,161 to 1,198 subjects. For all other analyses, number of subjects is 1,801 to 1,879. Those without a risk behavior, such as virgins or nondrug users, are coded as zero.

older youths may last longer and have more sexual activity, the average rate of partner turnover remains fairly constant. The frequency of condom use is relatively high, but it declines somewhat with age. In previously published multivariate analyses, the strong negative effect of age on condom use persisted, after controlling for various characteristics, such as the partner's use of the contraceptive pill, the length of the relationship with the partner, attitudes toward condom use, and age at first intercourse (13). Race and region maintained significant independent effects as correlates of condom use.

There are significant differences by region in condom use and frequency of intercourse. Mean frequency of condom use was highest in the Midwest and lowest in the Northeast and West, while the average acts of intercourse were highest in the Northeast. Such regional differences detected in a nationally representative survey suggest that local surveys of adolescent behavior may not be generalizable across regional boundaries.

Homosexual behavior and sexual orientation. While heterosexual behaviors are important with respect to AIDS, heterosexual risk behavior still is a relatively small source of HIV infection (14). Other risk behaviors, such as homosexual intercourse and IV drug use, are major sources of HIV infection. These high sensitivity behaviors were assessed in the confidential self-administered questionnaires.

Table 2 summarizes measures of prevalence for homosexual and IV drug use behaviors. Because they are stigmatized acts, if not illegal, the behaviors are likely to be under-reported. We note that the number of people reporting high-risk activity is so small (less than 50 people) that further disaggre-

gation, such as by race or ethnicity, or age, is not feasible.

Based on responses to the self-administered questionnaire, 2.1 percent of the teenage men ever had some homosexual contact with a man, such as mutual masturbation and insertive or receptive oral-genital or anal-genital intercourse. Only 1.4 percent had ever had insertive or receptive oral-genital or anal-genital intercourse, which are means of HIV transmission. Only 0.3 percent reported insertive or receptive oral-genital or anal-genital homosexual intercourse in the past year. The number of young men reporting homosexual behavior was small and should not be used to represent homosexual youth in general. However, of the 20 men who reported homosexual oral-genital or anal-genital intercourse in the past year, a majority (weighted 52.6 percent) reported never using a condom. Data were missing on these items for about 2.6 to 2.8 percent of the men. We examined the potential for item nonresponse bias by comparing the data for nonresponders on related questions (sexual orientation and attitudes about homosexuality) and failed to find evidence of bias.

Another common method of describing homosexuality is based on self-reported sexual orientation, which can be considered a personality measure, as opposed to a behavioral measure. Table 3 notes data on responses to a question about ever having homosexual intercourse, comparing the data to sexual orientation, as shown by responses to the question, "People are different in their sexual attraction to other people. Which best describes your feelings?" A large majority (87 percent) said they were 100 percent heterosexual, but 13 percent provided other responses, including "don't know," and some did not answer.

The prevalence of unprotected homosexual inter-

| Sex with prostitute | | Had STD | | Sex with IV drug user | | Ever used IV drugs | | Frequency of use of alcohol | | Frequency of use of cocaine | |
|---------------------|---------|-------------|---------|-----------------------|---------|--------------------|---------|-----------------------------|---------|-----------------------------|---------|
| Coefficient | P value | Coefficient | P value | Coefficient | P value | Coefficient | P value | Coefficient | P value | Coefficient | P value |
| 0.073 | < 0.01 | -0.064 | < 0.05 | -0.055 | < 0.05 | -0.010 | NS | -0.131 | < 0.001 | -0.157 | < 0.001 |
| 0.080 | < 0.001 | 0.138 | < 0.001 | 0.058 | < 0.01 | 0.063 | < 0.01 | 0.334 | < 0.001 | 0.214 | < 0.001 |
| 0.091 | < 0.001 | 0.117 | < 0.001 | 0.051 | < 0.05 | 0.058 | < 0.01 | 0.305 | < 0.001 | 0.188 | < 0.001 |
| 0.107 | < 0.001 | 0.130 | < 0.001 | 0.078 | < 0.01 | 0.162 | < 0.001 | 0.047 | < 0.05 | 0.099 | < 0.001 |
| ... | ... | 0.092 | < 0.001 | 0.245 | < 0.001 | 0.055 | NS | 0.021 | < 0.01 | 0.106 | < 0.001 |
| ... | ... | ... | ... | 0.065 | < 0.01 | 0.106 | < 0.001 | 0.021 | NS | 0.052 | < 0.05 |
| ... | ... | ... | ... | ... | ... | 0.269 | < 0.001 | 0.029 | NS | 0.045 | < 0.05 |
| ... | ... | ... | ... | ... | ... | ... | ... | 0.036 | NS | 0.202 | < 0.001 |
| ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 0.265 | < 0.001 |

STD = sexually transmitted disease. NS = not significant.
SOURCE: National Survey of Adolescent Males, 1988.

course is epidemiologically important because it can be a highly efficient means of HIV transmission. The prevalence of homosexual intercourse was small, but the sexual orientation data could indicate a pool of young men who may later initiate unprotected homosexual behavior. Nonetheless, there are discrepancies between reported homosexual intercourse and sexual orientation. The majority of those who had homosexual intercourse define themselves as mostly or 100 percent heterosexual. Some young men who described themselves as mostly or 100 percent homosexual had not had any homosexual intercourse. These discrepancies between behavioral and personality measures of homosexuality may indicate the potential turbulence and problems of gender identification faced by some young men.

Other risk behavior. HIV prevalence is high among IV drug users and prostitutes (15). Fewer than 1 percent (0.7 percent) of the men ever had sex with a prostitute and 0.7 percent ever had intercourse with an IV drug user. In both cases, however, reports of the partners' risk status were secondhand, from the subject, who perhaps did not know the actual risk status of his partners.

Perhaps the highest risk activity is IV drug use and sharing needles. One-half of 1 percent (0.5 percent) said that they ever used IV drugs. One-fifth of 1 percent (0.2 percent) said that they ever shared IV drug needles. This is roughly consistent with the 1988 National Household Survey on Drug Abuse, which found 0.4 percent of 12- to 17-year-old adolescents reporting having injected drugs (16). However, both surveys miss homeless or runaway youths, among whom drug use probably is more common.

We defined a group of youths at high risk of

HIV infection, based on having any one of the following behaviors: had five or more partners in the last year, ever had insertive or receptive homosexual intercourse, ever had sex with a prostitute or an IV drug user, or ever used IV drugs. About one-tenth (9.6 percent) reported one or more of these behaviors.

Correlation of risk and preventive behaviors. Recent research suggests that AIDS-related risks may be more common among high-risk groups such as crack users or patients attending STD clinics (4, 5). An important concept in understanding risk behavior among adolescents is the problem behavior syndrome (17). Underlying preferences toward risk-taking may lead some adolescents to manifest multiple risk behaviors, such as adolescent sex, poor school performance, drug use, and criminal activity. Thus, individual behaviors may be part of a larger syndrome of risk-taking tendencies.

Table 4 presents a matrix of correlation coefficients for 10 AIDS-related risk and preventive behaviors. Nonparametric Spearman rank-order coefficients are used, owing to the nonnormal distribution of the variables; Pearson coefficients yielded similar results. In addition to the variables mentioned, we added frequency of alcohol use and frequency of cocaine use (coded 1 = not used in past year, 2 = used a few times in past year, 3 = used monthly, 4 = used weekly, and 5 = used daily). Hingson and coworkers have observed associations between alcohol use, drug use, and unprotected sex among adolescents in Massachusetts (18). Substance abuse during sex may reduce inhibitions and protective behaviors. Also included among the variables was ever having an STD (including gonorrhea, syphilis, herpes, and venereal warts).

Three findings are noteworthy. First, condom

'Since a majority of teenage men are sexually active and at risk of HIV and STD infection, universal school-based AIDS and sex education programs can serve as a general vehicle for primary prevention.'

use is negatively correlated with most risk behaviors. Condom use is a preventive behavior that stands in clear contrast to risk behaviors. Alternatively, one could say that unprotected sex (without a condom) is a risk behavior that is correlated with other risk behaviors.

Second, most of the other risk behaviors are positively correlated. For example, those with the most heterosexual partners are most likely to have had sex with a prostitute, to be among those who drink the most, to have used cocaine most often, and to have tried IV drugs, as well as having used condoms least. While these correlations mostly are statistically significant, the magnitude of the correlations is not necessarily high.

Third, homosexual intercourse, oral-genital or anal-genital, did not correlate with frequency of condom use, frequency of heterosexual intercourse, or number of women partners, although it did correlate with other risk behaviors. Homosexual intercourse does not fit well into a monolithic problem behavior syndrome, and it may reflect a different risk-taking profile among homosexual adolescents.

We can demonstrate the risk-taking profile by the 9.6 percent of teenage men who fell into the previously defined high-risk group. Among the sexually active, those at high risk had a mean frequency of condom use of 0.45 versus 0.57 for those not at risk ($P < 0.001$, Mann-Whitney U-test). In other words, they used condoms about a fifth less often than risk-averse youths, despite the fact that they are probably at higher risk.

Discussion

We describe the prevalence and interrelationships of risk and preventive behaviors that may affect HIV transmission among teenage men in 1988. About three-fifths of the 15- to 19-year-olds had ever had sexual intercourse, but the prevalence of high-risk behavior was relatively low. However, about 10 percent of them can be classified as at

high risk, based on a variety of risk behaviors; those tend to engage in multiple-risk behavior and to use condoms least.

The data are based on self-reports of sensitive behaviors. Despite careful survey design and conduct, teenage men may over-report behaviors they think are socially desirable (such as condom use and perhaps sexual initiation) and under-report behaviors they think are undesirable (such as drug use or homosexual behaviors). The validity of the findings may be assessed by comparisons with data from other surveys and with nonsurvey data.

For condom use, NSAM findings are similar to those from a survey in Massachusetts and a national high school survey (19, 20). One study found that increases in condom use among teenagers were paralleled by increases in condom sales (21). Analyses of the National Survey of Family Growth show that women report increased condom use by their partners (22). As noted, NSAM data on IV drug use were consistent with the 1988 National Household Survey on Drug Abuse. NSAM estimates of homosexual intercourse were slightly lower than data from the 1988 Project HOPE Survey of AIDS Risk Behavior and Knowledge for the United States, which found that 6.6 percent of sexually active men 16 to 20 years of age had some sexual contact with another man in the last 5 years (personal communication, R. Sell, Project HOPE, Chevy Chase, MD, July 1990).

Expressed similarly, NSAM estimated that 3 percent of sexually active 15- to 19-year olds had participated in homosexual behaviors (including mutual masturbation). Perhaps the NSAM estimate was lower because it was more specific in asking about homosexual behaviors. Other methodological differences included the reference period ("ever" versus "last 5 years") and sampling or survey differences.

We indicated the association of many, but not all, HIV risk behaviors in a nationally representative sample of young men. Other research shows the developmental relationship between sexual and drug use behaviors (23, 24). Our analyses demonstrate that condom use is related negatively to most other risk behavior, and that those young men who have multiple partners, who have intercourse most frequently, and who drink most often, are least likely to use condoms during the course of a year than those who do not demonstrate risk behavior. Conversely, those who are using condoms most often are most likely to be practicing other safe behaviors.

Those involved in public health issues are atten-

tive to rates of single-risk behaviors, such as the proportions of youths who drink and those who have multiple sexual partners. Our analyses indicate, however, that those who have one risk are likely to have others as well. Multi-problem youths are most likely to fall prey to medical and social problems, such as AIDS, STD, teenage parenthood, and other sequelae of risk behavior. From a public health perspective, multi-problem youths, those at highest risk of HIV and STD infection, need most often to use condoms and practice other preventive behaviors. The National Research Council has emphasized the importance of directing AIDS prevention activities to high-risk youths (25).

Multi-problem youths generally are hard to reach because they are likely to be out of school and defiant of usual social norms. Multiple risk behaviors indicate a broad tendency toward a form of risk-taking that resists many standard public health prevention approaches directed to youth.

Health and education professionals and community leaders have an important role to play, since often they are involved in identifying one or more problems among teenagers. When a youth with one problem is identified, it may be wise to provide screening and counselling for other risk behaviors, since problems are often linked. We hear of epidemics of drug use or other social problems among teenagers; it is not surprising that diverse risk behaviors are intertwined and may exacerbate the AIDS and STD epidemics.

Since a majority of teenage men are sexually active and at risk of HIV and STD infection, universal school-based AIDS and sex education programs can serve as a general vehicle for primary prevention. The rising level of condom use suggests that many youths are receptive to prevention messages. But reaching multi-problem youths requires secondary prevention approaches for those who already have some problem behaviors. The multi-problem youths are not just the homeless or drug-addicted; they include youths who appear more mainstream, but who exhibit important risk behaviors, such as numerous sexual partners or frequent alcohol use.

Prevention messages should emphasize eliminating and reducing risky behavior and encourage preventive behavior, such as condom use, more careful selection of partners, and avoiding IV drug use and needle sharing. Out-of-school and community intervention programs are needed to focus on multi-problem youths (26). Developing effective prevention methods and disseminating information on them to multi-problem youths is an important

challenge for public health, education, and public policy.

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The Potential Efficiency of Routine HIV Testing of Hospital Patients—Data from a CDC Sentinel Hospital

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Synopsis

St. Paul-Ramsey Medical Center is a member of the Centers for Disease Control (CDC) Sentinel Hospital Surveillance Group. The authors have modified the surveillance group's protocol in order

to calculate what percentage of the human immunodeficiency virus (HIV)-infected samples identified came from persons known by them to be HIV infected. All identifiers are still unlinked from the sample before testing for HIV.

After 24 months, the HIV seroprevalence was 0.96 percent and the estimated cost of identifying a "new" seropositive at this site is \$4,530 to \$9,060. This range is a cost estimate; a typical laboratory charge for the HIV ELISA screen, if applied to such a testing program, would considerably increase this estimate.

Modifications to the protocol design that would target patients in certain demographic groups (for example, men ages 15 to 44 years) or HIV-associated diseases might improve efficiency but could miss a significant number of HIV-infected patients. The efficiency of hospital-based HIV testing would likely decline after several years of practice. Although there are significant ethical problems with programs attempting routine hospital-based HIV testing, pilot testing may merit consideration in areas where the HIV-1 seroprevalence is greater than 1 percent.

THE INTRODUCTION TO CLINICAL practice of testing for antibody to the human immunodeficiency virus (HIV) has led to controversy about its use. An unofficial consensus has developed recommending that patient consent and counseling be used in conjunction with the test (1-4). Two developments have prompted us to reexamine the issue. First, clinical advances in HIV care can provide benefit to persons even at an early state of infection (5).

Second, data from the Centers for Disease Control's (CDC) Sentinel Hospital Project found high levels of HIV infection endemic in some areas, which led to the following conclusion—"there is a need for routine screening of HIV infection among some groups of patients, regardless of presentation" (6). As one of the participating sites in the CDC's sentinel project, we examined our data to determine seroprevalence and cost estimates.